Table B: AT&T's Share of Presubscribed Cellular Customers

MSA	AT&T Share
Dallas	77%
St. Louis	84%
Kansas City	76%
San Antonio	79%
Oklahoma City	88%

Given AT&T's anti-competitive price discrimination, I would expect AT&T's share of cellular customers to be lower than its landline share if MCI and Sprint were truly competing with AT&T for this traffic. Instead, MCI and Sprint have been willing to follow the lead of AT&T and to also price discriminate against the cellular long distance customers.

IV. Removal of the Equal Access and MFJ Restrictions on BOC Cellular Providers Would Lead to Lower Long Distance Prices to Cellular Customers

31. Absent the MFJ restrictions and imposition of an equal access requirement on other cellular carriers, current EACP cellular customers would pay lower long distance prices. The EACP companies would be able to offer lower priced interLATA service since they will be able to buy interLATA service in bulk. The situation would change from the current situation where an EACP customer buys from the undiscounted Basket 1 tariff, say about 16 minutes per month on average, to the situation where the EACP itself would buy from a Tariff 12, or similar contract from another IXC, at much lower prices which it would pass on to its customers. For instance, a BOC would be able to buy long distance service and pay in the range of $0.04-0.08 per minute which it could then resell to its cellular customers at well below the current average rate of about $0.15-0.35 per minute which cellular customers currently

pay for their long distance service.[23] Since the EACP itself could purchase long distance service at a discount of about 60% or more from current Basket 1 retail rates, it could offer significantly cheaper cellular long distance rates than its cellular customers currently must pay to IXCs. Thus, contrary to MCI's claims, wholesale competition among IXCs for all of a cellular system's long distance traffic would increase competition and lead to lower long distance rates for cellular customers.[24] (See para. 18 of the NPRM)

32. Previous claims by AT&T and other IXCs that BOC and other cellular customers will face higher prices than they currently do where standard AT&T tariffs (or other IXC offerings) are used is contradicted by both economics and by actual experience. First, the cellular carriers have a clear profit incentive to offer lower long distance prices to their customers. The BOCs or other cellular carriers such as GTE, with the exception of AT&T/McCaw, cannot hope to monopolize or otherwise exercise market power in the interLATA long distance market.[25] In the situation where the downstream market cannot be monopolized, it has long been known that the upstream firm will provide the downstream product at a competitive price to create the highest possible demand for the upstream product. And this behavior is observed in cellular markets where cellular airtime is the upstream product and downstream services such as voice mail are often provided at marginal cost (or even below) to enhance demand for the upstream product.

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[23] Thus, I disagree with the tentative conclusion in the NPRM (para. 36) that IXCs would compete more on the basis of price if they offered service to end users, rather than offering service to the mobile carrier. All evidence points to the contrary conclusion, since mobile carriers are large enough buyers to achieve sizeable volume discounts which are never offered to individual EACP customers.

[24] Indeed, in the UK where cable operators have begun to offer telephone service, they buy their long distance service in bulk from a single provider and resell it to their customers. They offer prices about 30% lower than the prices charged for long distance by the two main IXCs, BT and Mercury, to residential customers.

[25] AT&T/McCaw is the exception because AT&T is by far the largest IXC and is currently exercising market power in the cellular long distance market.

33. Almost no non-BOC cellular company offers equal access long distance service. Instead, they often offer expanded local services across LATA boundaries, since they are not constrained by the MFJ. McCaw's service in Florida provides a convenient example. McCaw offers continuous coverage on the eastern side of Florida with service from the southern tip of the state, Key West, beyond Palm Beach and encompassing central Florida. McCaw does not charge long distance fees for calls within Florida, but it does charge a roaming premium of between $0.25-0.34 minute depending on which plan is subscribed to by the customer. For interstate calls the long distance carrier is AT&T, and no choice of long distance carrier is provided to the customer.

34. Resellers who use BOC cellular networks to provide service also often do not provide a choice of a long distance carrier. I surveyed cellular resellers in the Los Angeles and San Francisco MSA to find out how often they provided a choice of long distance carriers. Only 48% of the resellers offered a choice of long distance carriers despite the fact that equal access to long distance carriers was provided on the BOC cellular networks. Thus, resellers who use exactly the same physical facilities as the BOC cellular companies with whom they are in competition, find it unnecessary to offer equal access despite the fact that any customer can obtain equal access and identical cellular service by switching to a BOC agent for service. These survey data demonstrate a lack of customer demand for equal access provision of long distance service for their cellular usage. (See para. 25 of the NPRM)

35. Absence of customer demand for equal access provision of long distance service is also found in a recent survey done by Bernard Engelhard for SBMS (Study #94-218, August 1994). The survey consisted of a stratified random sample from SBMS customers in nine cellular regions. The overall sample size was 900 individuals. The overwhelming preference of SBMS customers, 72% of the responses, is to have both cellular and long distance service offered by the cellular provider along with the opportunity to have an

expanded local coverage area and a single bill. This absence of customer demand for a separate cellular provider and separate cellular long distance provider is especially striking, given the fact that cellular customers who have a strong preference for a single company providing both services would have already chosen to buy their cellular service from a non-EACP, e.g. in Dallas and San Antonio where McCaw, currently a non-EACP, is the Block A carrier. Thus, the 72% response would be even higher if all cellular customers in the SBMS region had been surveyed. Furthermore 62% of the respondents rated a large calling area as the most important feature of their cellular service while only 7% rated the choice of a long distance company to be most important. Thus, the SBMS survey is consistent with the market action of the resellers--customer do not value the choice of a separate cellular long distance provider, but they would rather have a single bill which includes both local cellular service and long distance service.

36. To date non-EACP cellular companies have passed along some of the savings from purchasing their long distance service in bulk from IXCs (usually AT&T), but they have not passed on all of the savings. They have not faced competition from BOC cellular companies on the Block B band because the BOC cellular companies have not been permitted to provide cellular long distance service. However, if the MFJ restrictions were removed from the BOC cellular companies so that they could provide cellular long distance service, competition would increase. Increased competition will cause cellular providers to pass on most of the savings to their cellular customers. Competition, rather than regulation, provides the best method to cause decreased prices for cellular long distance service from the current above competitive prices.

37. Two pro-competitive effects would follow from not imposing equal access requirements on cellular providers and from eliminating the equal access and other MFJ restrictions on BOC cellular carriers are: increased

economic efficiency and lower prices to consumers. Increased economic efficiency will occur because higher cost switched access from cellular MTSOs to IXCs' POPs will be replaced by lower cost non-switched access provided by LECs, competitive access providers, or by private facilities.[26] Lower prices to consumers (and another source of increased economic efficiency) will occur because of the lower cost basis of long distance service, lower prices for the long distance component of the service, and increased competition by current EACP and non-EACP cellular companies.

38. I estimate that lower prices to cellular customers will lead to consumer savings in the range of $750 million to about $1.1 billion per year with an increase in consumer welfare (taking account of the price elasticity for long distance calls) of between $1.0-1.4 billion per year. Thus, the cost of the current equal access and MFJ restriction on each EACP cellular customer is between $50 to $75 per year. A regulatory system which permitted the EACPs to purchase long distance service in bulk and to resell it to their customers would lead to greater competition and lower prices to consumers. No reason exists to permit the IXCs to continue charging their anti-competitive high prices to EACP cellular customers.

V. THE PROPER GEOGRAPHIC CALLING SCOPES EXTEND WELL BEYOND THE CURRENT LATA BOUNDARIES

39. InterLATA boundaries do not correspond in any rational manner to the actual usage of cellular telephones. In about an hour's drive from my house in a Boston suburb I can go from the eastern Massachusetts LATA to 6 other LATAs--western Massachusetts, Rhode Island, Connecticut, New Hampshire, Maine, and Vermont. Whenever I travel into another nearby LATA and decide to

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[26] Indeed, 92% of AT&T's non-EACPs currently use non-switched access for connections to AT&T's network. See the Amicus filing of August 8, 1994 by the Attorney General of California to the MFJ Court. (pp. 21-22)

call home or my office at MIT, I am forced to pay the high cellular long distance prices charged by the IXCs since both cellular carriers in the Boston MSA are EACPs (NYNEX and SBMS). Allowing the EACPs to enlarge their calling scopes so that cellular carriers can offer extended local service to correspond better to cellular customers' usage would lead to lower prices and increased competition.

40. I recommend that the minimum appropriate geographical regions for provision of extended local calls, to replace the current system of LATAs, are the MTAs. An EACP (or other cellular company) would be able to offer an expanded calling scope within an MTA at a uniform price; no separate long distance charges would apply. For instance, Nynex could choose to offer a single price service for calls within the Route 495 ring road around Boston as well as southern New Hampshire, Rhode Island, and perhaps southern Maine all of which are within about 1 hour's drive from Boston. While these areas are in 4 different LATAs, they are all within the Boston MTA No. 05.

41. The question that arises is whether this extended calling scope would permit an EACP or non-EACP cellular company to extend its market power, under the assumption that the cellular company can exercise market power.[27] The key fact to recognize here is that absent rate regulation of the cellular company, extension of its calling scope will not give it the ability to raise its local prices above their previous levels since these prices were not constrained by regulation.[28] Thus, the concern of evasion of regulation will not apply because regulation is not binding on price. The NPRM's concern that the question of whether to apply equal access depends, in part, upon an

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[27] The NPRM raises questions about whether cellular companies can exercise market power.

[28] Note that no state currently uses rate of return regulation on cellular companies. The DOJ's reference to California in its recent submission to the MFJ Court is incorrect in its claims regarding regulation of cellular service in California.

analysis of possible market power of various CMRS providers (para. 31) is incorrect as a matter of economics so long as cellular is not rate of return regulated. Economic theory demonstrates that mandatory equal access will not lead to lower cellular prices even if cellular companies have market power.[29] As I explained above, equal access is more likely to lead to even higher cellular long distance service prices.

42. Next, consider the decision of an EACP cellular company on the extent of the local calling scope. I will use Nynex service centered in Boston (the "hub" of the universe) as an example. Currently, Nynex is only permitted to provide cellular calls in the eastern Massachusetts LATA; all other cellular calls are interLATA calls and are carried by an IXC. Every second of interLATA long distance calls on the Nynex network generates an equivalent second of airtime for Nynex, i.e. fixed proportions. Thus, Nynex can set its price to a profit maximizing level taking into account its demand curve which is a combination of demand for local and long distance cellular calls. This same reasoning would apply to all EACPs in determining their calling scopes.

43. With an extended geographical area beyond LATAs, Nynex now could choose to extend its calling scope into the adjacent states of Rhode Island, Maine and New Hampshire since they are all in the Boston MTA. Nynex could choose to leave the calling scope as it currently is, but Nynex will decide to increase the calling scope if profits will increase accordingly. Nynex will increase the calling scope up to the point where its increased (marginal) revenue equals its increased (marginal) cost from providing the increased calling scope. Marginal revenue will increase only if customers are offered a lower effective price for their combination of local and long distance calls

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[29] This conclusion could change if cellular companies could force IXCs to exit the market and allow them to monopolize the downstream long distance market. Given the small proportion of cellular long distance minutes relative to overall long distance, such at outcome is inconceivable.

so that demand for cellular airtime will increase to Nynex. This increase in demand, which arises from a lower effective price, is pro-competitive and benefits consumers. Furthermore, NYNEX could well be forced to extend its calling scope because of competition from SBMS, the Block A carrier in Boston, if SBMS were permitted to increase its calling scope. Competition is better than regulation at determining consumers' preferences for the appropriate size of calling scopes.

44. Overall, economic theory leads to the conclusion that output would increase and customers would benefit from an increased calling scope for EACPs. Since cellular providers are not rate of return regulated, they will increase their calling scope only if they can increase the demand for cellular calls. This increased demand is equivalent to a lower overall price for cellular customers. Consumers benefit from these lower prices. No opportunity exists for the EACPs to monopolize the downstream market, so no ability to "leverage" upstream market power or "foreclose" downstream competition exists. An increased calling scope will not impede competition, and it will benefit consumers. Furthermore, the results of the 1994 SBMS survey which I discussed above, demonstrate that an expanded calling scope was by far (62%) the feature most desired by SBMS cellular customers.

VI. PRICING EXPERIENCE DEMONSTRATES THAT EACPs WILL PASS ON COST DECREASES TO CONSUMERS

45. Non-MFJ constrained cellular companies offer expanded local calling areas beyond the artificially determined LATA boundaries. Perhaps the best known example is McCaw which offers "City of Florida" service along the eastern part of Florida. Consumers obviously find such a service appealing; otherwise, McCaw would not offer the service. Indeed, McCaw and other non-BOC cellular companies make their expanded local calling areas a major feature of their advertising. McCaw has made the same calculation that an EACP would

make after a waiver were granted and it was able to determine the scope of its local calling areas on the basis of its added revenue and added cost. For Miami for an average monthly use of 160 minutes, the McCaw price is $95 per month while the BOC cellular provider, Bell South, charges $94.51 for the same amount of minutes. Thus, market experience has demonstrated that customer demand exists for calling areas which expand beyond LATA boundaries and that consumers have not been charged higher prices.

46. I have examined the pricing experience of BOC cellular companies after they have been granted increases in calling scope.[30] In Table 1 of the Exhibit B the expansion of BOC cellular calling scopes is tabulated. Overall the average increase in calling scope as the result of the waivers has been 24.9%. The percentage price changes, comparing price per minute on a before and after waiver basis, are listed in Table 2. In almost all cases where a waiver was granted, real cellular prices decreased. Prices rose in only a few situations: for example, in the Denver MSA prices increased from $0.49 per minute to $0.52 per minute and in Clarksville, TN, prices increased from $0.25 per minute to $0.48 per minute. Overall, the average percentage change is -1.33%, but a more informative statistic is probably the median change which is -4.61% per minute.[31] Thus, BOC cellular companies have not raised their prices with increases in their calling scopes. If anything, they have lowered their prices or kept them the same. At the same time the cellular long distance rates decreased significantly for cellular customers who previously had to pay both local airtime charges as well as a long distance charge. After the waiver was granted, the latter long distance charge was eliminated.

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[30] These price data were collected by Information Enterprises and Kagan and Associates for the period 1985-91. A basis of 150 minutes per month is used since this usage was used by Information Enterprises in its reports.

[31] The mean change is affected greatly by the change in Clarksville which is over 5 times as large as any other change in price. This increase occurred because an introductory plan which gave callers 100 minutes of free usage each month was ended at the same time as the waiver was granted. The median is the mid-point of price changes so that 50% of price changes are greater than the median.

Thus, customers received significant price decreases for their long distance calls within the increased calling scope permitted by the waiver. These results of lower prices and expanded calling scopes have benefitted consumers. Thus, the evidence of the benefits of vertical integration requested in para. 41 of the NPRM is demonstrated by these expanded calling scopes and real price decreases.

47. Lastly, in Table 3 I consider the price experience in RSAs where waivers have permitted very large increases in calling scopes in rural areas. In 125 out of the 151 times (83%) where a waiver was granted real cellular prices decreased after the waiver. The average percentage change is -5.70% while the median change is -5.72%. Thus, granting of waivers for RSAs led to constant or lower cellular prices in a large majority of cases. Again, cellular customers in these RSAs benefit from the removal of the long distance charges and the increased calling scope. They also benefitted from the lower prices.

Jerry A. Hausman

Subscribed and sworn to before me
this 7th day of September 1994.

Notary Public
My Commission Expires 7/3/1998

Table 1.
Expansion of BOC Cellular Affiliate Calling Scopes

Waiver Name	LATA Area	Waivered Area	Waiver as a % of LATA Area
Allentown	6266	687	11.0
Atlantic City (Ocean County)	1378	793	57.5
Boston Area (Rockingham County, NH)	6016	1171	19.5
Central Illinois	3669	4016	109.5
Chicago	8064	360	4.5
Clarksville (Hopkinsville, KY)	18020	599	3.3
Connecticut-Springfield	5074	2730	53.8
Denver-Colorado Springs	60470	2631	4.4
Duluth	16130	1163	7.2
El Paso-Las Cruces	117600	809	0.7
Houston	22370	1899	8.5
Huntsville	19630	1398	7.1
Lexington	18420	203	1.1
Los Angeles	40720	6854	16.8
Minneapolis	8660	805	9.3
New York	3865	2056	53.2
Orlando-Daytona Beach	4617	1031	22.3
Philadelphia Area	6266	2574	41.1
Washington-Baltimore	3638	2150	59.1
Wilmington	6266	491	7.8
TOTAL	377139	34421	24.9

Note: Areas are reported in square miles.

Table 2.
Effect of Calling Scope Waivers on BOC Cellular Affiliate Prices

Waiver (Date)	Bell Company	CITY	Per Minute Price Before Waiver (date)	Per Minute Price After Waiver (date)	Percentage Change
Washington (6/25/85)	Bell Atlantic	Washington	0.61 (1/1/85)	0.53 (1/1/86)	-13.19
Washington (9/22/87)	Southwestern Bell	Washington	0.53 (1/1/86)	0.51 (10/1/87)	-3.61
Los Angeles (2/24/87)	Pacific Telesis	Los Angeles	0.78 (1/1/86)	0.76 (10/1/87)	-3.61
Chicago (9/22/87)	Southwestern Bell	Chicago	0.43 (1/1/86)	0.41 (10/1/87)	-3.61
Central Illinois (9/8/88)	Ameritech	Springfield	N/A	0.48 (10/1/88)	N/A
		Champaign	N/A	0.48 (10/1/88)	N/A
		Bloomington	N/A	0.48 (10/1/88)	N/A
		Decatur	N/A	0.48 (10/1/88)	N/A
Kansas City-St. Joseph (3/31/88)	Southwestern Bell	Kansas City	0.53 (10/1/87)	0.51 (10/1/88)	-3.45
		St. Joseph	N/A	0.51 (10/1/88)	N/A
Lawrence-Topeka (3/31/88)	Southwestern Bell	Lawrence	N/A	0.51 (10/1/88)	N/A
		Topeka	N/A	0.51 (10/1/88)	N/A
Lexington (9/6/88)	BellSouth	Lexington	0.52 (10/1/87)	0.49 (10/1/88)	-6.21
Connecticut-Springfield (9/6/88)	NYNEX	Springfield	0.59 (10/1/87)	0.56 (10/1/88)	-3.86
Connecticut-Springfield (1/14/92)	Bell Atlantic	Springfield	0.51 (10/1/91)	0.49 (12/1/93)	-5.02
		New London/ Norwich	0.51 (10/1/91)	0.49 (12/1/93)	-5.02
		Hartford	0.51 (10/1/91)	0.49 (12/1/93)	-5.02
		Bridgeport	0.51 (10/1/91)	0.49 (12/1/93)	-5.02
		New Haven	0.51 (10/1/91)	0.49 (12/1/93)	-5.02
Philadelphia (9/6/88)	Bell Atlantic	(Salem County, NJ)			
		Philadelphia	0.51 (10/1/87)	0.51 (10/1/88)	-0.30
Philadelphia (2/2/89)	Bell Atlantic	(Mercer, Hunterdon, and Warren Counties)			
		Trenton	0.51 (10/1/88)	0.49 (10/1/89)	-4.61
Philadelphia (2/15/91)	Bell Atlantic	Wilmington	0.49 (10/1/90)	0.51 (10/1/91)	4.44
Philadelphia (2/15/91)	Bell Atlantic	Allentown	0.47 (10/1/90)	0.51 (10/1/91)	9.35
Atlantic City (9/6/88)	Bell Atlantic	Atlantic City	N/A	0.66 (10/1/88)	N/A
		Vineland/ Millville	N/A	0.66 (10/1/88)	N/A
Houston (2/2/89)	Bell South	Houston	0.56 (10/1/88)	0.53 (10/1/89)	-4.61
Duluth (2/2/89)	US West	Duluth	0.51 (10/1/88)	0.43 (10/1/89)	-16.06
Minneapolis (2/2/89)	US West	Minneapolis	0.52 (10/1/88)	0.43 (10/1/89)	-18.07
Clarksville, TN (2/2/89)	BellSouth	Clarksville	0.25 (10/1/88)	0.48 (10/1/89)	89.85

Note: Per Minute prices have been rounded to two decimal places. However, the percentage change figures were calculated using data taken to more than two decimal places. "N/A" is entered where data was unavailable.

Waiver (Date)	Bell Company	CITY	Per Minute Price Before Waiver (date)	Per Minute Price After Waiver (date)	Percentage Change
Orlando-Daytona Beach (2/2/89)	BellSouth	Orlando	0.42 (10/1/88)	0.40 (10/1/89)	-4.61
		Daytona Beach	N/A	0.45 (10/1/89)	N/A
		Melbourne	0.42 (10/1/88)	0.40 (10/1/89)	-4.61
Huntsville (2/2/89)	Bell South	Huntsville	0.44 (10/1/88)	0.36 (10/1/89)	-17.89
El Paso-Las Cruces (1/14/92)	Bell Atlantic	El Paso	0.29 (10/1/91)	0.27 (12/1/93)	-5.72
		Las Cruces	0.29 (10/1/91)	0.27 (12/1/93)	-5.72
New York (1/28/87)	NYNEX	New York	0.75 (1/1/86)	0.75 (10/1/87)	0.90
Boston-Rockingham County (9/6/88)	NYNEX	Boston	0.59 (10/1/87)	0.56 (10/1/88)	-3.86
		Providence	0.59 (10/1/87)	0.56 (10/1/88)	-3.86
		Worcester	0.59 (10/1/87)	0.56 (10/1/88)	-3.86
Denver-Colorado Springs	US West	Denver	0.49 (10/1/87)	0.52 (10/1/88)	5.39
		Colorado Springs	0.49 (10/1/87)	0.52 (10/1/88)	5.39
		Greeley	N/A	0.52 (10/1/88)	N/A
		Fort Collins/ Loveland	N/A	0.52 (10/1/88)	N/A
Average Percent Change					-1.33
Median Percent Change					-4.61

Table 3.
Effect of RSA Waiver on BOC Cellular Affiliate Prices

Bell Company	CITY	STATE	Per Minute Price Before Waiver	Per Minute Price After Waiver	Percentage Change
			10/1/91	12/1/93	
Ameritech	Chicago	IL	0.34	0.33	-2.62
	Detroit	MI	0.38	0.37	-2.74
	Milwaukee	WI	0.32	0.30	-4.06
	Cincinnati	OH	0.40	0.37	-7.56
	Columbus	OH	0.40	0.37	-7.56
	Dayton	OH	0.40	0.37	-7.56
	Gary	IN	0.34	0.33	-2.62
	Flint	MI	0.38	0.37	-2.74
	Madison	WI	0.32	0.30	-4.06
	Hamilton	OH	0.40	0.37	-7.56
	Springfield	IL	0.34	0.37	10.81
	Springfield	OH	0.40	0.37	-7.56
	Racine	WI	0.32	0.30	-4.06
	Champaign/Urbana	IL	0.34	0.37	10.81
	Janesville/Beloit	WI	0.32	0.30	-4.06
	Decatur	IL	0.34	0.37	10.81
	Kenosha	WI	0.32	0.30	-4.06
	Bloomington/Normal	IL	0.34	0.42	25.33
	Kankakee	IL	0.34	0.33	-2.62
	Sheboygan	WI	0.32	0.30	-4.06
	Aurora/Elgin	IL	0.34	0.33	-2.62
	Joliet	IL	0.34	0.33	-2.62
Bell Atlantic	Philadelphia	PA	0.51	0.46	-10.87
	Washington	DC	0.47	0.44	-6.04
	Pittsburgh	PA	0.48	0.42	-13.96
	Baltimore	MD	0.47	0.44	-6.04
	Allentown	PA	0.51	0.46	-10.87
	Wilmington	DE	0.51	0.46	-10.87
	Reading	PA	0.51	0.46	-10.87
	Trenton	NJ	0.51	0.63	23.24
	Atlantic City	NJ	0.56	0.63	13.47
	Vineland/Millville	NJ	0.56	0.63	13.47
BellSouth	Miami	FL	0.48	0.51	5.79
	Atlanta	GA	0.50	0.48	-5.19
	New Orleans	LA	0.42	0.40	-5.72
	Memphis	TN	0.34	0.38	11.61
	Louisville	KY	0.38	0.37	-1.59
	Birmingham	AL	0.41	0.39	-4.80
	Nashville	TN	0.38	0.36	-5.72
	Jacksonville	FL	0.46	0.43	-7.24
	Richmond	VA	0.39	0.35	-11.05
	Orlando	FL	0.36	0.35	-3.00
	West Palm Beach	FL	0.48	0.35	-26.36
	Baton Rouge	LA	0.26	0.42	58.76
	Mobile	AL	0.45	0.36	-19.81
	Chattanooga	TN	0.41	0.38	-5.72
	Columbia	SC	0.38	0.33	-14.81
	Lexington	KY	0.38	0.37	-1.59
	Huntsville	AL	0.36	0.34	-5.72
	Melbourne	FL	0.36	0.35	-3.00
	Macon	GA	0.50	0.47	-6.26
	Daytona Beach	FL	0.41	0.35	-13.85

Note: Price per minute figures are rounded to two decimal places. However, percentage change figures were calculated using data taken to more than two decimal places.

Bell Company	CITY	STATE	Per Minute Price Before Waiver	Per Minute Price After Waiver	Percentage Change
	Lafayette	LA	0.50	0.39	-22.60
	Clarksville	TN	0.38	0.36	-5.72
	Tuscaloosa	AL	0.41	0.39	-4.80
	Athens	GA	0.50	0.48	-5.19
	Anniston	AL	0.41	0.39	-4.80
	Florence	SC	0.44	0.33	-25.98
	Gadsden	AL	0.41	0.39	-4.80
NYNEX	New York	NY	0.68	0.62	-9.25
	Boston	MA	0.53	0.45	-15.24
	Buffalo	NY	0.37	0.39	4.93
	Providence	RI	0.53	0.45	-15.24
	Albany	NY	0.35	0.39	9.30
	Syracuse	NY	0.37	0.35	-4.23
	Worcester	MA	0.53	0.45	-15.24
	New Brunswick	NJ	0.72	0.62	-13.53
	Long Branch	NJ	0.72	0.62	-13.53
	New Bedford	MA	0.53	0.45	-15.24
	Orange County	NY	0.63	0.59	-5.92
	Poughkeepsie	NY	0.63	0.59	-5.92
	Portland	ME	0.36	0.45	23.85
	Pittsfield	MA	0.35	0.34	-3.70
	Glens Falls	NY	0.35	0.35	-0.24
	Lewiston	ME	0.36	0.46	25.69
PacTel	Los Angeles	CA	0.49	0.59	21.69
	Detroit	MI	0.38	0.35	-5.86
	San Francisco	CA	0.62	0.51	-17.69
	Atlanta	GA	0.43	0.35	-19.51
	San Diego	CA	0.52	0.50	-4.96
	San Jose	CA	0.62	0.51	-17.69
	Sacramento	CA	0.32	0.31	-5.72
	Toledo	OH	0.35	0.33	-5.72
	Grand Rapids	MI	0.38	0.35	-5.86
	Flint	MI	0.38	0.35	-5.86
	Oxnard/Ventura	CA	0.49	0.46	-5.72
	Lansing	MI	0.38	0.35	-5.86
	Saginaw/Bay/Midland	MI	0.38	0.35	-5.86
	Stockton	CA	0.32	0.31	-5.72
	Modesto	CA	0.32	0.31	-5.72
	Lima	OH	0.35	0.38	9.29
	Reno	NV	0.46	0.44	-5.72
	Muskegon	MI	0.38	0.35	-5.86
	Chico	CA	0.47	0.44	-5.72
	Athens	GA	0.43	0.35	-19.51
	Redding	CA	0.47	0.44	-5.72
	Yuba City	CA	0.32	0.31	-5.72
Southwestern Bell	Chicago	IL	0.35	0.33	-6.65
	Boston	MA	0.40	0.39	-3.22
	Washington	DC	0.41	0.40	-2.55
	Dallas/Fort Worth	TX	0.56	0.32	-43.02
	St. Louis	MO	0.43	0.42	-2.53
	Baltimore	MD	0.41	0.40	-2.55
	Kansas City	KS	0.42	0.39	-7.77
	San Antonio	TX	0.48	0.34	-29.39

Bell Company	CITY	STATE	Per Minute Price Before Waiver	Per Minute Price After Waiver	Percentage Change
	Oklahoma City	OK	0.39	0.44	13.82
	Gary	IN	0.35	0.33	-5.71
	Worcester	MA	0.40	0.44	11.39
	Wichita	KS	0.38	0.35	-7.37
	Corpus Christi	TX	0.48	0.34	-29.39
	McAllen	TX	0.48	0.34	-29.39
	Lubbock	TX	0.46	0.42	-9.87
	Brownsville	TX	0.48	0.34	-29.39
	Springfield	IL	0.34	0.33	-1.54
	Topeka	KS	0.42	0.39	-7.77
	Amarillo	TX	0.28	0.42	51.36
	Champaign/Urbana	IL	0.34	0.33	-1.54
	Abilene	TX	0.49	0.43	-10.44
	Decatur	IL	0.34	0.33	-1.54
	Bloomington/Normal	IL	0.34	0.33	-1.54
	Odessa	TX	0.46	0.41	-10.84
	St. Joseph	MO	0.42	0.39	-7.77
	Sherman/Dennison	TX	0.56	0.32	-43.02
	Midland	TX	0.46	0.41	-10.84
	Lawrence	KS	0.42	0.39	-7.77
US West	Minneapolis/St. Paul	MN	0.42	0.42	-1.09
	San Diego	CA	0.51	0.44	-13.39
	Denver	CO	0.54	0.39	-28.49
	Seattle	WA	0.52	0.40	-22.51
	Phoenix	AZ	0.50	0.46	-8.76
	Salt Lake City	UT	0.45	0.47	4.46
	Omaha	NE	0.41	0.39	-4.26
	Tucson	AZ	0.50	0.46	-8.76
	Tacoma	WA	0.52	0.41	-21.30
	Albuquerque	NM	0.37	0.39	7.16
	Des Moines	IA	0.40	0.41	3.86
	Spokane	WA	0.50	0.40	-19.25
	Colorado Springs	CO	0.54	0.39	-28.49
	Eugene	OR	0.31	0.33	6.11
	Duluth/Superior	MN	0.41	0.40	-2.43
	Provo/Orem	UT	0.45	0.53	17.68
	Boise	ID	0.58	0.49	-16.01
	Ft. Collins/Loveland	CO	0.54	0.39	-28.49
	Bremerton	WA	0.52	0.41	-21.30
	Fargo/Moorhead	ND	0.41	0.43	3.97
	Olympia	WA	0.52	0.41	-21.30
	Greely	CO	0.54	0.39	-28.49
	Sioux Falls	SD	0.40	0.38	-5.47
	Bellingham	WA	0.52	0.41	-21.30
	Grand Forks	ND	0.41	0.43	3.97
	Casper	WY	0.40	0.39	-3.88
Average Percent Change					-5.70
Median Percent Change					-5.72

May 1994

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OXFORD UNIVERSITY
D. Phil. 1973 (Ph.D)
B. Phil. 1972

BROWN UNIVERSITY
A.B. (Summa Cum Laude), 1968

THESIS: "A Theoretical and Empirical Study of Vintage Investment and Production in Great Britain," Oxford University, 1973.

FELLOWSHIPS, HONORS AND AWARDS:

Phi Beta Kappa
Marshall Scholar at Oxford, 1970-1972
Scholarship at Nuffield College, Oxford, 1971-1972
Fellow of Econometric Society, 1979.
Frisch Medal of the Econometric Society, 1980
Fisher-Schultz Lecture for the Econometric Society, 1982
John Bates Clark Award of the American Economic Association, 1985
Jacob Marschak Lecture for the Econometric Society, 1988
American Academy of Arts and Sciences, 1991.

EMPLOYMENT:

MASSACHUSETTS INSTITUTE OF TECHNOLOGY

1992-	John and Jennie S. MacDonald Professor
1979-	Professor, Department of Economics
1976-79	Associate Professor, Department of Economics
1973-76	Assistant Professor, Department of Economics
1972-73	Visiting Scholar, Department of Economics

VISITING APPOINTMENTS:

1986-87	Visiting Professor, Harvard Business School
1982-83	Visiting Professor, Harvard University Department of Economics

U.S. ARMY, ANCHORAGE, ALASKA

1968-70	Corps of Engineers

PROFESSIONAL ACTIVITIES:

Associate Editor, Bell Journal of Economics, 1974-1983
Associate Editor, Rand Journal of Economics, 1984-1988
Associate Editor, Econometrica, 1978-1987
Reviewer, Mathematical Reviews, 1978-1980
American Editor, Review of Economic Studies, 1979-82
Associate Editor, Journal of Public Economics, 1982-
Associate Editor, Journal of Applied Econometrics, 1985-1993
Member of MIT Center for Energy and Environmental Policy Research, 1973-
Research Associate, National Bureau of Economic Research, 1979-
Member, American Statistical Association Committee on Energy Statistics, 1981-1984
Special Witness (Master) for the Honorable John R. Bartels, U.S. District Court for the Eastern District of New York in Carter vs. Newsday, Inc., 1981-82
Member of Governor's Advisory Council (Massachusetts) for Revenue and Taxation, 1984-1992
Member, Committee on National Statistics, 1985-1990
Member, National Academy of Social Insurance, 1990-
Member, Committee to Revise U.S. Trade Statistics 1990-1992
Director, MIT Telecommunications Economics Research Program, 1988-
Board of Directors, Theseus Institute, France Telecom University, 1988-
Member, Conference on Income and Wealth, National Bureau of Economic Research, 1992-

PUBLICATIONS:

I. Econometrics

"Minimum Mean Square Estimators and Robust Regression," Oxford Bulletin of Statistics, April 1974.

"Minimum Distance and Maximum Likelihood Estimation of Structural Models in Econometrics," delivered at the European Econometric Congress, Grenoble: August 1974.

"Full-Information Instrumental Variable Estimation of Simultaneous Equation Models," Annals of Economic and Social Measurment, October 1974.

"Estimation and Inference in Nonlinear Structural Models," Annals of Economic and Social Measurement, with E. Berndt, R.E. Hall, and B.H. Hall, October 1974.

"An Instrumental Variable Approach to Full-Information Estimators in Linear and Certain Nonlinear Econometric Models," Econometrica, May 1975.

"Simultaneous Equations with Errors in Variables," delivered at Winter Econometric Meetings, San Francisco: December 1974; published in Journal of Econometrics 5, 1977, pp. 389-401.

"Social Experimentation, Truncated Distributions, and Efficient Estimation," delivered at the World Econometric Congress, Toronto: August 1975; Econometrica, with D. Wise, June 1977.

"A Conditional Probit Model for Qualitative Choice," delivered at World Econometric Congress, Toronto: August 1975; MIT Working Paper 173, April 1976; Econometrica, with D. Wise, March 1978.

PUBLICATIONS cont.:

"Specification Tests in Econometrics," MIT Working Paper 185, June 1976; Econometrica, 1978.

"Non-Random Missing Data," with A.M. Spence, MIT Working Paper 200, May 1977.

"Attrition Bias in Experimental and Panel Data: The Gary Income Maintenance Experiment," with D. Wise, J.F. Kennedy School Working Paper, May 1977; Econometrica, January 1979.

"Missing Data and Self Selection in Large Panels," with Z. Griliches and B.H. Hall, Harvard Economics Department Working Paper, August 1977; delivered at INSEE conference on Panel Data, Paris: August 1977; Annales de l'INSEE, April 1978.

"Stratification on Endogenous Variables and Estimation," with D. Wise, J.F. Kennedy School Working Paper, January 1978; delivered at CME Conference, April 1978; in The Analysis of Discrete Economic Data, ed. C. Manski and D. McFadden, MIT Press, 1981.

"Les models probit de choix qualitatifs," ("Alternative Conditional Probit Specifications for qualitative Choice.") (English Version), September 1977; EPRI report on discrete choice models, presented at INSEE Seminar, Paris: May 1978; Cahiers du Seminar d'Econometrie, 1980.

"The Econometrics of Labor Supply on Convex Budget Sets," Economic Letters, 1979.

"Panel Data and Unobservable Individual Effects," with W. Taylor, MIT Working Paper 225; Econometrica 49, November 1981.

"Comparing Specification Tests and Classical Tests," with W. Taylor, August 1980, Economic Letters, 1981.

"The Effect of Time on Economic Experiments," invited paper at Fifth World Econometrics Conference, August 1980; in Advances in Econometrics, ed. W. Hildebrand, Cambridge University Press, 1982.

"Sample Design Considerations for the Vermont TOD Use Survey," with John Trimble, Journal of Public Use Data, 9, 1981.

"Identification in Simultaneous Equations Systems with Covariance Restrictions: An Instrumental Variable Interpretation," with W. Taylor, December 1980; Econometrica, 1983.

"Stochastic Problems in the Simulation of Labor Supply," presented at NBER conference, January 1981; in Tax Simulation Models, ed. M. Feldstein, University of Chicago Press, 1983.

"The Design and Analysis of Social and Economic Experiments," invited paper for 43rd International Statistical Institute Meeting, 1981; Review of the ISI.

"Specification and Estimation of Simultaneous Equation Models," in Handbook of Econometrics, ed. Z. Griliches and M. Intriligator, vol. 1, 1983.

"Full-Information Estimators," in Kotz-Johnson, Encyclopedia of Statistical Science,vol. 3, 1983

"Instrumental Variable Estimation," in Kotz-Johnson, Encyclopedia of Statistical Science, vol. 4, 1984

PUBLICATIONS cont.:

"Specification Tests for the Multinomial Logit Model," with D. McFadden, October 1981; Econometrica, 1984.

"Econometric Models for Count Data with an Application to the Patents R&D Relationship," with Z. Griliches and B. Hall, NBER Working Paper, August 1981; Econometrica, 1984.

"The Econometrics of Nonlinear Budget Sets," Fisher-Shultz lecture for the Econometric Society, Dublin: 1982; Econometrica, 1985.

"The J-Test as a Hausman Specification Test," with H. Pesaran, November 1982; Economic Letters, 1983.

"Seasonal Adjustment with Measurement Error Present," with M. Watson, May 1983; Journal of the American Statistical Association, 1985.

"Efficient Estimation and Identification of Simultaneous Equation Models with Covariance Restrictions," with W. Newey and W. Taylor, October 1983; Econometrica, 1987.

"Technical Problems in Social Experimentation: Cost Versus Ease of Analysis," with D. Wise, in Social Experimentation, ed. J. Hausman and D. Wise, 1985.

"Errors in Variables in Panel Data," with Z. Griliches, Journal of Econometrics, 1986.

"Specifying and Testing Econometric Models for Rank-Ordered Data," with P. Ruud; Journal of Econometrics, 1987.

"Semiparametric Identification and Estimation of Polynomial Errors in Variables Models," with W. Newey, J. Powell and H. Ichimura, 1986, Journal of Econometrics, 1991.

"Flexible Parametric Estimation of Duration and Competing Risk Models," with A. Han, November 1986, revised January 1989, Journal of Applied Econometrics, 1990.

"Consistent Estimation of Nonlinear Errors in Variables Models with Few Measurements," with W. Newey and J. Powell, 1987.

"Nonlinear Errors in Variables: Estimation of Some Engel Curves," Jacob Marschak Lecture of the Econometric Society, Canberra 1988, forthcoming in Journal of Econometrics.

"Optimal Revision and Seasonal Adjustment of Updated Data: Application to Housing Starts," with M. Watson, Journal of the American Statistical Association Proceedings, 1991.

"Seasonal Adjustment of Trade Data," with R. Judson and M. Watson, ed. R. Baldwin, Behind the Numbers: U.S. Trade in the World Economy, 1992.

"Nonparametric Estimation of Exact Consumers Surplus and Deadweight Loss," with W. Newey, 1990, revised 1992, forthcoming Econometrica.

"Misclassification of a Dependent Variable in Qualitative Reponse Models," with F. Scott-Morton, mimeo December 1993.

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"The Evaluation of Results from Truncated Samples," with D. Wise, Annals of Economic and Social Measurement, April 1976.

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"The Effect of Taxation on Labor Supply: Evaluating the Gary Negative Income Tax Experiment," with G. Burtless, October 1977; Journal of Political Economy, December 1978.

"AFDC Participation -- Permanent or Transitory?," delivered at NBER-NSF Conference, August 1978; in Papers from the European Econometrics Meetings, ed. E. Charatsis, North Holland: 1981.

"The Effect of Wages, Taxes, and Fixed Costs on Women's Labor Force Participation," March 1979; presented at SSRC-NBER Conference on Taxation, Cambridge, England: June 1979; Journal of Public Economics, October 1980.

"The Effect of Taxes on Labor Supply," presented at Brookings Conference, October 1979; published in How Taxes Affect Economic Behavior, ed. H. Aaron and J. Pechman, Brookings: 1981.

"Income and Payroll Tax Policy and Labor Supply," presented at St. Louis Fed. conference, October 1980; in The Supply Side Effects of Economic Policy, ed. G. Burtless, St. Louis: 1981.

"Individual Retirement Decisions Under an Employer-Provided Pension Plan and Social Security," with G. Burtless, Journal of Public Economics, 1982.

"Individual Retirement and Savings Decisions," with P. Diamond, October 1981; presented at SSRC-NBER Conference on Public Economics, Oxford: June 1982; Journal of Public Economics, 1984.

"Retirement and Unemployment Behavior of Older Men," with P. Diamond, presented at Brookings Conference on the Aged, November 1982; in H. Aaron and G. Burtless, Retirement and Economic Behavior, Brookings: 1984.

"Tax Policy and Unemployment Insurance Effects on Labor Supply," May 1983; in Removing Obstacles to Economic Growth, ed. M. Wachter, 1984.

"Family Labor Supply with Taxes," with P. Ruud, American Economic Review, 1984.

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"Household Behavior and the Tax Reform Act of 1986," with J. Poterba, October 1986; Journal of Economic Perspectives, 1987, also published in French in Annales D'Economie et de Statistique, 1988.

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"Income Taxation and Social Insurance in China," in Sino-U.S. Scholars on Hot Issues in China's Economy, 1990.

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"Project Independence Report: A Review of U.S. Energy Needs up to 1985," Bell Journal of Economics, Autumn 1975.

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PUBLICATIONS cont.:

"Evaluating the Costs and Benefits of Appliance Efficiency Standards," with P. Joskow, MIT Energy Lab Working Paper, MIT-EL82005WP; American Economic Review, 72, 1982.

"Information Costs, Competition and Collective Ratemaking in the Motor Carrier Industry," presented at Conference On Consensual Decision Making, American University, August 1982; American University Law Review, 1983.

"An Overview of IFFS," presented at EIA-NBS Conference on Energy Models, August 1982; in Intermediate Future Forecasting System, ed. S. Gass et al., Washington: 1983.

"Choice of Conservation Actions in the AHS," November 1982; in Energy Simulation Models, ed. R. Crow, 1983.

"Patents and R&D: Searching for a Lag Structure," with B. Hall and Z. Griliches, in Actes du Colloque Econometrie de la Recherce, Paris: 1983.

"The Demand for Optional Local Measured Telephone Service," in Adjusting to Regulatory, Pricing and Marketing Realities, East Lansing: 1983.

"Patents and R&D: Is There a Lag?," with B. Hall and Z. Griliches, 1985; International Economic Review, 1986.

"Price Discrimination and Patent Policy," with J. MacKie-Mason, Rand Journal of Economics, 1988.

"Residential End-Use Load Shape Estimation from Whole-House Metered Data," IEEE Transactions on Power Systems, 1988 (with I. Schick, P. Vsoro, and M. Ruane).

"Competition in Telecommunications for Large Users in New York," with H. Ware and T. Tardiff, Telecommunications in a Competitive Environment, 1989.

"Innovation and International Trade Policy," Oxford Review of Economic Policy, 1988 (with J. MacKie-Mason).

"The Evolution of the Central Office Switch Industry," with W. E. Kohlberg, 1987; in ed. S. Bradley and J. Hausman, Future Competition in Telecommunications, 1989.

"Future Competition in Telecommunications," 1987; ed. S. Bradley and J. Hausman, Future Competition in Telecommunications, 1989.

"Joint Ventures, Strategic Alliances and Collaboration in Telecommunications," presented at International Conference on Joint Ventures in Telecommunications, October 1989, Regulation, 1991.

"An Ordered Probit Model of Intra-day Securities Trading," with A. Lo and C. MacKinlay, Journal of Financial Economics, 1992.

"A Proposed Method for Analyzing Competition Among Differentiated Products," with G. Leonard and J.D. Zona, Antitrust Law Journal, 60, 1992.

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"A Utility-Consistent Combined Discrete Choice and Count Data Model: Assessing Recreational Use Losses Due to Natural Resource Damage," with G. Leonard and D. McFadden, October 1992, forthcoming in the Journal of Public Economics.

"Global Competition and Telecommunications," in Bradley, et al., ed., Globalization, Technology and Competition, 1993.

"The Bell Operating Companies and AT&T Venture Abroad and British Telecom and Others Come to the US," presented at Harvard Business Conference on International Telecommunications, 1991, in Bradley, et al., ed., Globalization, Technology and Competition, 1993.

"Competitive Analysis with Differentiated Products," with G. Leonard and D. Zona, September 1992, forthcoming in Annales, D'Economie et de Statistique.

"The Effects of the Breakup of AT&T on Telephone Penetration in the US," with T. Tardiff and A. Belinfante, American Economic Review, 1993.

"Proliferation of Networks in Telecommunications," presented at Michigan Conference on Regulation, March 1993.

"Valuation of New Goods Under Perfect and Imperfect Competition," mimeo April 1994.

"The Effect of Superstars in the NBA: Economic Value and Policy," with G. Leonard, mimeo May 1994.

JOINT REPORTS, TESTIMONY, AND BOOKS:

"Project Independence: An Economic Analysis," Technology Review, May 1974.

"The FEA's Project Independence Report: Testimony before Joint Economic Committee," U.S. Congress, March 18, 1975.

"The FEA's Project Independence Report: An Analytical Assessment and Evaluation," NSF Report, June 1975.

"Energy Demand in the ERDA Plan," with D. Wood, Energy Laboratory Report, August 1975.

"A Note on Computational Simplifications and Extensions of the Conditional Probit Model," EPRI report on choice models, September 1977.

"Labor Supply Response of Males to a Negative Income Tax," Testimony for U.S. Senate Finance Subcommittee on Public Assistance, November 22, 1978.

"Appliance Choice with Time of Day Pricing," Energy Laboratory Report, January 1980.

"Discrete Choice Models with Uncertain Attributes," Oak Ridge National Laboratories Report, January 1980.

JOINT REPORTS, TESTIMONY, AND BOOKS cont.:

"Individual Savings Behavior," with P. Diamond, Report to the National Commission on Social Security, May 1980.

"Wealth Accumulation and Retirement," with P. Diamond, Report to the Department of Labor, May 1982.
"A Review of IFFS," Report to the Energy Information Agency, February 1982.

"A Model of Heating System and Appliance Choice," with J. Berkovec and J. Rust, December 1983.

"Labor Force Behavior of Older Men After Involuntary Job Loss," with L. Paquette, Report to Department of Health and Human Services, December 1985.

"Pollution and Work Days Lost," with D. Wise and B. Ostrow, NBER Working Paper, January 1984; Revised 1985.

"Demand for Interstate Long Distance Telephone Service," with A. Jafee and T. Tardiff, November 1985.

"Competition in the Information Market 1990", August 1990.

The Choice and Utilization of Energy Using Durables, ed. J. Hausman, Palo Alto: EPRI, 1981.

Social Experimentation, ed. J. Hausman and D. Wise, Chicago: 1985.

Future Competition in Telecommunications, ed. S. Bradley and J. Hausman, Harvard: 1989.

Contingent Valuation: A Critical Appraisal, ed. J. Hausman, North Holland, 1993.

Globalization, Technology and Competition, ed. S. Bradley, J. Hausman, R. Nolan, Harvard 1993.

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